

Atlas II AS rocket
arriving at Vandenberg
Air Force Base.



National Security Space Enabling Joint Warfighting

U.S. Air Force (Steve Schester)

By PETER B. TEETS

Although less than fifty years have passed since man ventured into space, the constellations of satellites in orbit have fundamentally changed life on Earth. Moreover, the exploitation of space, like that of land, sea, and air, has often had an unrecognized impact on modern warfare.

This did not happen overnight. In the early stages of the space age, only a limited group of users on the most strategic level used the great majority of space capabilities, and those systems were highly classified. The recently declassified Corona program of the National Reconnaissance Office is an example of such a development.

Distinctions among military, national intelligence, civil, and commercial programs are being increasingly blurred and in some cases are virtually seamless. The same overhead imagery

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used by an analyst inside the beltway could be downloaded and exploited by a soldier in Afghanistan. The same global positioning system (GPS) satellites providing a navigation signal to fighters on patrol over Iraq could guide hikers in the Rockies or provide timing to an electric power grid.

Space capabilities are woven deeply into the fabric of modern society. Commerce relies on them for the swift flow of information and transactions, and the national security arena depends on them for joint warfighting and protection of the homeland. It is clearly within this context that the defense and intelligence communities are striving to provide the right space capabilities to meet present and future national security challenges.

Space Capabilities

The Armed Forces are currently waging a conflict across the spectrum of warfare. Operations range from defending against a variety of unpredictable threats against the homeland to thwarting aggression by projecting national power to the farthest reaches of the globe. At the same time, the capabilities, strengths, and exploitation of space have never been so pivotal to warfighting success. Without question, space assets form the backbone of the global information and intelligence networks that gather and disseminate data, coordinate efforts, guide forces and weapons, and assess results. They are key enablers of the precision warfare that not only reduces risk to American troops, but saves innocent lives by minimizing collateral damage.

Who would have predicted that aging B-52s could provide close air support with the help of precision targeting via satellite communications and global positioning? Or that Special Operations Forces mounted on horseback would download intelligence onto laptops via satellite or navigate by GPS devices? One can only begin to imagine the endless ways in which space will be critical to warfighters tomorrow. Space capabilities are no longer just nice to have—they are indispensable. It is against this backdrop of the ever-increasing importance of



Pentagon from
432 miles.

Space Imaging

space, and the current war against new threats, that we find ourselves at an historic point in the way the Nation organizes and advances its national security space capabilities.

Executive Agent

The Commission to Assess U.S. National Security Space Management and Organization recognized security dependencies on space, identified vulnerabilities in the space arena, and laid out a roadmap for improved organization and execution of the range of national security space activities.

These included a separate four-star commander of Air Force Space Command (in addition to the combatant commander of the former U.S. Space Command), realignment of the Air Force Space and Missile Systems Center into Air Force Space Command, and combining acquisition milestone decision authority for all space systems with the responsibilities of the Under Secretary of the Air Force and the Director of the National Reconnaissance Office.

The Space Commission gave the Air Force a significant challenge in recommending that the service be the designated DOD executive agent for space, “with department-wide responsibility for planning, programming, and acquisition of space systems.” This is certainly not a set of tasks that one service can accomplish. The Air Force is working with the Departments of the Army and Navy, defense agencies, joint warfighters, the intelligence community, and civil and commercial users to ensure a comprehensive approach to national security space stewardship. Unity of vision and execution is needed to fulfill the mission of ensuring strong and capable space systems for national security needs. In this age with its many requirements, competition for resources is high, and systems—especially space capabilities—are in demand by the widest spectrum of users. Success is virtually impossible without a true unity of effort among all stakeholders.

Restoring Faith

The national security space team faces a number of challenges. One is to restore confidence in space acquisition programs. For various reasons recent problems have brought the credibility of the acquisition community into question in the minds of the defense leadership and Congress. Despite severe reductions in defense budgets over the past decade, the appetite for capabilities remained, especially space

the Air Force is working to ensure a comprehensive approach to national security space

capabilities. The tolerance for risk went up, and the team changed the way it did business, seeking to cut costs and levels of government involvement. It delegated too much responsibility to contractors, reduced the flexibility of program managers by giving them extremely small and heavily restricted management reserves, and fell short in budgets for research and development, a practice that can strangle leading edge technology programs, yield insufficient options, and increase risk in developing those actually available.



To fix these problems, the team has implemented some changes, but more are required. The commander of the Space and Missile Center has been dual-hatted with the duties of the Air Force program executive officer for space, reporting in the latter capacity directly to the Under Secretary of the Air Force. The team has also taken steps to streamline the overall process by reducing acquisition decisionmaking time, including independent cost assessments.

Accountability is another area of emphasis. The contract recently awarded on the tri-agency national polar-orbiting operational environmental satellite system included a new twist: an executive compensation clause. It states that the board of directors of a company must consider program performance when determining the amount of compensation to award its top executives. It is the intent that

such a clause will be implemented on all major new national security space contracts.

These steps are only the first of many to vector space acquisition in the right direction. The national security space team is committed to making further changes across the spectrum of acquisition, with emphasis on adequate fiscal reserves and schedule flexibility, more focused management attention, discipline in requirements, and openness throughout the leadership chain. These efforts are essential if the team is to deliver the critical space capabilities needed for joint warfighting in the years ahead.

Assured Access

Another key challenge is ensuring access to space when it is needed. Like a warship in port or an aircraft in the hangar, a spacecraft on the launch pad



JDAMs under wing of B-52, Enduring Freedom.

U.S. Air Force (Greg M. Kobashigawa)

Transforming Capabilities

In view of the threats of the 21st century, it is vital across DOD to strive to meet the President's mandate to renew and rebuild warfighting concepts, organizational constructs, and force structure. The efforts in the national security space arena are not meant to transform space systems in themselves but to produce those new capabilities that enable transformed warfighting as a whole.

One key initiative underway is development of a transforming communications architecture. The vision is eliminating bandwidth and access as constraints for warfighters. Such a frictionless global communications network will certainly rely heavily on terrestrial communications pathways. But truly global coverage, anytime, anywhere, for anyone, will rely on space for a considerable amount of this capability. It is the only way warfighters in remote locations—and the Navy at sea anywhere—will be able to plug into such a network.

This increasing need for communications is widely recognized. Last year the National Security Space Architect led a study to outline a vision for an integrated communications network that included both laser and radio frequency communications capabilities. The study confirmed that the baseline program plan would not meet forecast requirements and the architecture needed for transformation. It also suggested that there is

now a critical window of opportunity to provide an architectural framework for a compatible communications system across the defense establishment, the intelligence community, and the National Aeronautics and Space Administration that increases capabilities by a factor of ten. The mission of the new Transformational Communications Office is developing the architecture and acquisition strategy to make this communications goal a reality.

Another effort that could benefit joint warfighters is space-based radar. It is envisioned that this radar will act

as the forward eyes for strike platforms and other intelligence, surveillance, and reconnaissance (ISR) assets by detecting surface movers (ground moving target indication) and rapidly imaging stationary targets (synthetic aperture radar). With a day/night, all-weather ability to look deep into denied territory, multiple theaters, and broad ocean areas, we hope to observe and predict adversary activities before, during, and after conflict. The potential of space-based radar for more precise and timely terrain mapping—high resolution terrain (elevation)—may yield benefits for mission planning and rehearsal, particularly for Special Operations Forces or other assets that may be inserted behind enemy lines or borders.

Beyond transforming communications and radar, we are pursuing new sources and methods of information and intelligence collection and exploitation that will yield transforming capabilities for national security. Systems that perform hyperspectral imaging or exploit measurement and signature intelligence in ways as yet unexplored exemplify such initiatives. Truly transformational capabilities will exponentially increase existing asymmetric advantages in warfighting, ensuring that any clash would be as one-sided as possible.

Science and Technology

Transforming warfighting and intelligence calls for continued investment in space science and technology efforts. Everything accomplished in national security space to date stems from past investments and developments in this area. Apportioning resources can be difficult since it requires stable, long-term investment and typically does not provide immediate benefits to current programs. But we cannot shy away from the responsibility to invest today for future capabilities—we must push the technology envelope.

Investments alone will not guarantee that the defense and intelligence communities obtain preeminent future space capabilities. Science and technology planning must be improved to ensure that we encourage an operational pull that conveys a clear vision of the

contributes little to joint warfighting and national security. To wield space power effectively, the Nation needs reliable and responsive means to get critical space systems into the fight; and that means getting them on orbit.

Legacy launch systems were expensive, with launch schedules measured in months or years. The team has worked to change that. The past year has seen successes with the maiden launches of two launch vehicles, the

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Atlas V and the Delta IV, both part of the evolved expendable launch vehicle program. These new launchers herald a new era of less expensive, simpler, and more reliable means to deploy space systems.

But the expendable launch vehicle is only the first step toward true assured access to space. We are exploring follow-on possibilities for responsive launch, from advanced and highly versatile reusable launch systems to small, low-cost expendables with extremely short response times. The goal is getting into orbit inexpensively, reliably, and on schedules measured in days or hours.

MOAB, largest nonnuclear precision-guided weapon.



capabilities needed for the future, address the full spectrum of future needs in a balanced and well-thought-out manner, and determine ways to demonstrate and spin-out promising technologies to programs.

Another critical ingredient is collaboration. A number of organizations contribute to science and technology, including the Air Force Research Laboratory, Naval Research Laboratory, and the National Reconnaissance Office. The more these agencies work together, and the more they involve other actors such as the Defense Advanced Research Projects Agency and the National Aeronautics and Space Administration, the more productive science and technology efforts become.

Fostering Professionalism

At the end of the day, developing a new professional culture among space professionals may prove the most decisive step. All the space capabilities imaginable will prove useless without the leadership, vision, motivation, and skills to employ them effectively.

Air Force Space Command is spearheading efforts to develop the process of growing space professionals within the service. But these efforts must not be limited to the Air Force alone. The Armed Forces as well as the civilian and

industry workforce will need space professionals to exploit space in the interest of national security.

The goal of developing a team of space professionals has bold implications. It is not simply creating a career field or developing an area of expertise. It involves steps that will eventually lead to an entirely new kind of warfighter that may ultimately transform the landscape of war. This process demands new ways of thinking. It will take time to nurture a space team—as it did with the development of land, sea, and air professionals before them.

Space capabilities are not ends in themselves. The objective is the ability to exploit the high ground of space to conduct decisive joint operations and enhance national security. That cannot be achieved without mission success in space. It means maintaining achievements in launches, keeping on-orbit capabilities at their peak, and ensuring that space support—missile warning, intelligence, weather data, and communications bandwidth—is readily available for whoever needs it.

Integration

Another essential ingredient to enabling effective joint warfighting is integration—among land, sea, air, and space; between old and new platforms; of new requirements and systems; and

among organizations across and down all sectors of government. There has been great progress; the range of those exploiting space capabilities has expanded from a small set of strategic users to multiple government agencies and virtually the entire warfighting force. But more is needed.

The conduct of intelligence, surveillance, and reconnaissance is an example. Airborne and spaceborne assets each have unique performance characteristics that complement one another. Advances in unmanned aerial vehicle technology are impressive, and the characteristics of these vehicles make them extremely valuable in environments such as Afghanistan. But spaceborne ISR assets have their own natural advantages, especially swift global reach and access. The requirement today is global. There is not a divot or puddle we do not want to access—and space capabilities are what reach those areas denied to other platforms for intelligence collection. Successful integration simultaneously leverages all these advantages to benefit warfighters.

We will have achieved effective integration when the way we collect information is unimportant; where the

machines, regardless of type or location, are talking to one another; where intelligence and information are easily obtained, whether the user is an intelligence analyst in Washington or a soldier in the field; where fixing, tracking, and targeting data are passed easily from platform to platform.

Controlling the High Ground

Gaining and holding the high ground has been a prescription for military success since the dawn of time. Space is the ultimate high ground, and although space exploration has gone on for almost half a century, the need to protect vital space capabilities is only now becoming accepted as comparable to control of the land, sea, and air. The national security needs to dominate space will only increase.

The first ingredient for control is awareness of the space environment: natural phenomena, spacecraft traffic, and natural or manmade threats to space systems. Steps have been taken to increase situation awareness capabil-

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ities, including the standup of the Space Situation Awareness Integration Office in Air Force Space Command and funding for surveillance assets over the next five years.

Control also requires protecting capabilities. The Nation must not take space capabilities for granted, nor can it ignore the increasing role they will play against friendly forces. If enemies recognize the value of space capabilities in modern warfare, they will not only seek to use them but to deny their use to others. These are the sorts of issues the Space Commission had in mind when it warned of a "Space Pearl Harbor."

Achieving effective space control also requires denying the high ground to enemies. With the integration of space capabilities across the spectrum of its warfighting operations, the United States is paving the road of 21st century warfare, and others will follow. What will occur in five years when Americans are put at risk because

enemy spaceborne imagery collectors, commercial or home-grown, identify and target the Armed Forces? What will be the response in a decade when an enemy leverages the global positioning system to launch an attack with precision?

The mission of space control has not been at the forefront of military thinking because an enemy using space capabilities has not yet put our own people at risk. That will change. Planners not only need to think about the mission and implications of space control, but it is fundamentally irresponsible not to consider them. Space is the ultimate high ground. The military advantage requires maintaining an edge over opposing capabilities, and American doctrine and capabilities must keep pace in meeting that challenge.

Future Warfighting

As space capabilities mature, integration into warfighting on land, at sea, and in the air is essential, and controlling the high ground of space is vital. But are there new and more innovative ways to exploit that medium to achieve desired warfighting effects?

Are there ways these capabilities can affect global strike operations in forms we can scarcely imagine today? Are there ways to use space capabilities to affect the enemy decisionmaking cycle or produce other effects to achieve campaign objectives in ways land, sea, and air forces cannot? Perhaps someday a lethal synergy of space positioning and tracking systems (global positioning and space-based radar) and high-ground weapons (the proposed space-based laser) will prove decisive in some circumstances. Or coupling space capabilities with information warfare will shut down an enemy command and control system before it can launch an attack.

We can no more perceive what contributions space will make to warfighting in future decades than military leaders a hundred years ago could foresee the impact airpower would

have on warfare today. But we must be open to any and all possibilities that would save lives, benefit warfighters, and protect the Nation.

The extent to which space has been used for military and other needs is phenomenal, and its uses in the future seem limitless. The Nation has embraced the potential for space-based capabilities, and the Armed Forces do not wish to fight without them any more than the civil sector would be willing to give up satellite communications, direct broadcast, global positioning, or weather services. Accordingly, planners must ensure that space systems and architectures are available for joint warfighters.

Space is inherently global and uniquely capable of supporting global interests. The ability to know about events, shape relations among states, project power, and deter or compel enemies will increasingly depend on space. These factors present challenges to the United States in accomplishing its national security objectives. **JFQ**